

EXTENDED CHARACTERIZATION OF THE COMMON-SOURCE AND COMMON-GATE AMPLIFIERS USING A METAL-FERROELECTRIC-SEMICONDUCTOR FIELD EFFECT TRANSISTOR

Mitchell Hunt^{1*}, Rana Sayyah¹, Cody Mitchell¹, Crystal Laws¹, Todd C. MacLeod², and Fat D. Ho¹

¹*The University of Alabama in Huntsville, Department of Electrical and Computer Engineering, Huntsville, Alabama, 35899, USA*

²*National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Alabama, 35812, USA*

Collected data for both common-source and common-gate amplifiers is presented in this paper. Characterizations of the two amplifier circuits using metal-ferroelectric-semiconductor field effect transistors (MFSFETs) are developed with wider input frequency ranges and varying device sizes compared to earlier characterizations. The effects of the ferroelectric layer's capacitance and variation load, quiescent point, or input signal on each circuit are discussed. Comparisons between the MFSFET and MOSFET circuit operation and performance are discussed at length as well as applications and advantages for the MFSFETs.

Keywords: common-source; common-gate; MFSFET; MFFET; metal-ferroelectric-semiconductor field effect transistor; FeFET; FFET; ferroelectric transistor

* Corresponding author: email: huntmr@uah.edu